

# EXHIBIT O



# TODAY'S VISION

THE ONE TO SEE®

August 30, 2013

To Whom It May Concern:

I had the pleasure of seeing Ms. Cheri LaBlanche for a comprehensive eye exam on August 18, 2013.

Ms. LaBlanche's entering visual concerns were computer eyestrain and blurred near vision. She also reported difficulty focusing on the computer with subsequent headaches after 30 minutes of computer usage. Ocular and medical histories were unremarkable, with the exception of seasonal allergies.

Her manifest refraction was OD: +0.75-0.50x030 (20/20) and OS: +1.00-1.00x145 (20/20). Blood pressure was slightly elevated at 148/94 mmHg. Otherwise, ocular health was unremarkable.

I educated Ms. LaBlanche on her current condition and informed her that the computer eyestrain was a result of her need for prescription eyeglasses. I recommended that she add an anti-glare coating to her lenses to help reduce incoming glare and halos. She was told to take frequent breaks every 20 minutes by looking away from her monitor and performing blinking exercises to reduce dry eye. In addition, I told her to have her monitor at or below eyelevel (10-15 degrees) at a distance of 20-24" away from her eyes.

In summary, Ms. LaBlanche presented with symptoms consistent with computer vision syndrome. She was advised to perform the above tasks to relieve and/or reduce her associated symptoms on the computer.

If we can be of any further assistance, please feel free to contact me.

Sincerely,

Dr. Vu Nguyen

Optometrist, Glaucoma Specialist

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# EXHIBIT A

advance for  
**NPs PAs**

### **Computer Vision Syndrome**

**Widespread computer use has created a new occupational health disorder called computer vision syndrome.**

A Growing Occupational Health Problem

By Michele Chamberland Graney, NP

More than 175 million U.S. residents now use computers in the workplace.<sup>1</sup> This widespread use has created a new occupational health disorder called computer vision syndrome.

The American Optometric Association (AOA) has defined computer vision syndrome as eye or vision problems associated with "near work" performed during use of a computer.<sup>1</sup> Another definition for computer vision syndrome, developed by the National Institute for Occupational Safety and Health (NIOSH), adds that prolonged computer use is a key component of computer vision syndrome.<sup>2</sup>

#### **Prevalence and Severity**

Using a computer for more than 2 hours per day can cause symptoms of computer vision syndrome. These symptoms occur in approximately 75% to 90% of computer users.<sup>1</sup> In comparison, only 22% of computer workers report musculoskeletal disorders.<sup>1</sup> The AOA estimates that 12 million visits to eye doctors each year are a result of computer-related problems. This translates to 1 of every 5 patients who seek eye examinations.<sup>2</sup> Some optometrists have referred to computer vision syndrome as a possible occupational epidemic of the 21<sup>st</sup> century.<sup>3</sup>



#### **Signs and Symptoms**

The symptoms of computer vision syndrome can be divided into four main categories: visual, ocular, general and musculoskeletal. The visual symptoms of computer vision syndrome include inability to maintain near focus, blurred or double vision, changes in color perception, flickering sensations, and glare.<sup>4</sup>

The most common complaints associated with computer vision syndrome are strained or tired eyes, redness, dry eyes, excessive tears or blinking, squinting, and contact lens discomfort resulting from dryness.<sup>4</sup>

Generalized symptoms associated with computer vision syndrome are headaches, excessive drowsiness, fatigue, poor concentration and irritability. The musculoskeletal symptoms of computer vision syndrome are usually a result of poor posture while seated at a computer. Common musculoskeletal symptoms include tension or pain in the neck, shoulders, back or arms.

#### **Workplace Triggers**

The known triggers for computer vision syndrome are a combination of inadequate office lighting, glare, improperly designed computer work stations, poor work habits and uncorrected vision.

Why are computer monitors so taxing to the eyes? On paper, words are made of solid lines. On a computer, words are made of tiny dots called pixels. It is harder for eyes to focus on pixels.

The eye works similarly to a camera in that it has an automatic focus. With increased computer use, the eyes are constantly trying to focus, which results in eye muscle fatigue. As with any muscle in the body, the eyes need breaks to rest and recover. Eyes are in their most relaxed position when their gaze is cast on objects 20 feet away or farther.<sup>1</sup> When gazing at these distances, the axes of the eyes are parallel, and the tension in the eye muscles is equal. When looking at objects closer than 20 feet, the eyes must rotate inward toward the nose so that the eyes can focus properly on the object; this is called convergence. As the object gets closer, the eyes must converge even more.<sup>2</sup>

When an employee looks at a computer screen for an extended period of time, the eyes become unbalanced due to prolonged convergence. Staring at a computer screen for extended periods irritates the eyes. Staring for long periods without blinking causes dryness of the eyes.

Visual fixation can cause a burning sensation in the eyes due to cramping of the eye muscles.<sup>2</sup>

#### **Office Lighting**

Improper office lighting can induce computer vision syndrome. Most offices are equipped with too much light, often in the form of bright overhead fluorescent lights. Overhead lighting can cause glare on computer screens. The AOA recommends removing half the bulbs from office ceiling fixtures or using desktop lamps instead of overhead light.<sup>5</sup> Replacing fluorescent bulbs with full-spectrum or incandescent bulbs can reduce glare and eye strain.<sup>2</sup>

Applying an antiglare screen over computer monitors can help alleviate glare. Select an antiglare screen that has the AOA seal of approval.<sup>6</sup> Glass computer screens are favored, but they are more costly than the mesh versions.<sup>1</sup> Mesh screens tend to accumulate more dust, which decreases overall screen clarity. Frequent dusting can reduce this tendency.

Situating the workstation with the computer monitor perpendicular to an office window will help alleviate glare.<sup>7</sup> If this strategic placement of the computer monitor is not feasible, the employer should try to shield outdoor light with the use of blinds, curtains or window tinting.

#### **Screen Proximity**

Workplace studies have found that most employees do not know the correct distance they should sit from their computer monitors. The AOA recommends placing the computer monitor 16 to 30 inches from the eyes. The top of the monitor should be slightly below horizontal eye level. Tilt the top of the monitor away from the user at a 10-degree to 20-degree angle.<sup>5</sup> The monitor should be placed directly in front of the user, and the middle of the screen should be at eye level.<sup>6</sup> Use of a document holder situated at the same distance as the computer monitor will prevent the eyes from having to change focus. It will also help eliminate extra movement of the neck to look down at a document on a desk top.

#### **Inadequate Breaks**

A NIOSH study published in July 2007 supported earlier research findings that supplementary eye breaks minimize discomfort and eye strain among data-entry employees. Eye strain was significantly lower when four 5-minute breaks were added to two established 15-minute breaks. Data entry speed was significantly faster with supplementary breaks, and work output was maintained despite the additional 20 minutes of breaks.<sup>8</sup>

Two ways to encourage work breaks are the three B approach and the 20/20/20 rule. The three B approach promotes taking a break to blink and breathe.<sup>1</sup> Blinking helps moisturize the eyes. The average person blinks 10 to 15 times per minute. When seated in front of a computer for an extended period of time, however, blinking may drop by 60%. The reduced blink rate while sitting at a computer monitor contributes to poor tear production. It also temporarily stresses the cornea, resulting in dry eyes.<sup>1</sup> The 20/20/20 concept promotes looking 20 feet away from the computer monitor for 20 seconds every 20 minutes.

Another workplace technique is job task variability. For example, have the employee engage in noncomputer work tasks, such as filing or copying for an hour or two, on most days.

#### **Uncorrected Vision**

If an employee complains of blurred vision despite situating a computer monitor according to recommendations, an optometric examination should be conducted. Some

#### **RELATED CONTENT**

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- Sjogren's Syndrome: Wandering in the Desert
- Herpes Zoster Alert

employees may assume that their prescription glasses for reading or distance are adequate for computer viewing. This is not true. Prescription computer eyeglasses are designed differently. Computer glasses are single lenses; they are not bifocals or trifocals. Bifocals or trifocals cause wearers to look down or up to see objects or print. Computer glasses are single focal lenses that allow the eyes to focus at the same time at the same distance. Computer lenses are specially designed with focal length about 6 inches longer than current prescription glasses. This elongated focal length prevents eye strain.<sup>6</sup>

### **The Nurse Practitioner and Physician Assistant Role**

Nurse practitioners and physician assistants can screen and educate patients about computer vision syndrome. Determine when patients are at risk for dry eyes and computer vision syndrome by obtaining medical and occupational histories. Gather information about previous ocular surgeries, use of any prescription glasses or contact lenses, and any history of predisposing conditions such as Sjorgen syndrome, rheumatoid arthritis, chronic dry mouth or autoimmune diseases.<sup>3</sup>

Obtain a detailed list of current prescription and nonprescription medications. Some medications can cause dry eyes (e.g., diuretics, antihistamines and antihypertensive).<sup>3</sup> In addition to finding out how many hours the patient spends at a computer, find out how often he or she cleans his or her eyeglasses or contact lenses and when the last eye examination was performed. Many patients may not be aware of the need for prescription glasses for computer use; provide education about this.

If vision screening equipment is available, NPs and PAs can perform the screening after undergoing appropriate training. If not, the NP or PA should be able to refer the patient to an optometrist who can perform the exam. A specialized screening device called the Prio Vision Tester can duplicate the pixels of a computer screen; it is the only Class I medical device with this capability. This simulation allows the optometrist or provider to determine the most accurate computer lens prescription.<sup>9</sup>

Treatments for dry eyes include lubricant eye drops. Additional patient teaching should include instructing the patient to always wash hands before instilling eye drops and proper techniques to avoid contaminating the eye drop solution. Ask whether the patient is staying well hydrated throughout the day. Lastly, counsel the patient to take time out each day to practice the three B or the 20/20/20 technique. If lubricant eye drops coupled with adequate work breaks don't improve the patient's symptoms, refer to an optometrist or ophthalmologist.

NPs and PAs should be knowledgeable about how to educate patients and managers about the principles of proper office and workstation design. If the employee is not able to instill such workplace changes, recommend an ergonomic evaluation. Many large corporations and institutions employ or contract ergonomists, engineers or other industrial hygienists who can perform workplace evaluations.

Environmental workplace controls such as proper lighting, correct computer monitor setup, adequate ventilation and availability of purified drinking water help alleviate dry eye and computer vision syndrome. NPs and PAs can and should advocate for healthy and safe work conditions by making such recommendations to employers. Present clinical studies and other data that demonstrate the value of such changes.

### **Putting It Into Practice**

Computer vision syndrome can be an insidious occupational health problem. With heightened patient and employer awareness and education, it can be easily treated and corrected. NPs and PAs can serve as diagnostic clinicians, educators, advocates and workplace liaisons to help combat computer vision syndrome.

*Michele Graney is a family nurse practitioner who provides occupational healthcare services at Brigham & Women's Hospital in Boston.*

### **References**

1. Anshel JR. Visual ergonomics in the workplace. *AAOHN*. 2007;55(10):414-420.
2. Cheu RA. Good vision at work. *Occup Health Saf*. 1998;67(9):20-24.

3. Blehm C, et al. Computer vision syndrome: a review. *Surv Ophthalmol.* 2005;50(3):253-262.
4. Sitzman K. Tips for managing computer vision syndrome. *AAOHN.* 2005;53(12):556.
5. The American Optometric Association. Healthy vision at the computer. Available at: <http://www.aoa.org/documents/Vision-Lifestyle-Fact-Sheet.pdf>. Accessed March 8, 2010.
6. Lomax J, Johanning E. The computer workstation. In: *Textbook of Occupational Medicine*. New York, N.Y: Elsevier; 2001: 176-177.
7. Partners Occupational Health Service Ergonomics Program. *Office Ergonomics Audit: Help for Your Workspace Needs*. Boston, Mass.: Partners OHS; 2002: 1-6.
8. NIOSH study finds supplementary breaks minimized discomfort, did not impair productivity. National Institute of Occupational Safety & Health. NIOSH eNews. Available at: <http://www.cdc.gov/niosh/enews/enewsV5N4.html>. Accessed March 8, 2010.
9. Prio Corporation. What can I do about CVS? Available at: <http://www.prio.com/consumers/solution.cfm>. Accessed March 8, 2010.

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# EXHIBIT B



American Optometric Association

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## Computer Vision Syndrome

### Suggestions for Computer Vision Syndrome Sufferers

- What causes Computer Vision Syndrome?
- How is Computer Vision Syndrome diagnosed?
- How is Computer Vision Syndrome treated?

**Computer Vision Syndrome** describes a group of eye and vision-related problems that result from prolonged computer use. Many individuals experience eye discomfort and vision problems when viewing a computer screen for extended periods. The level of discomfort appears to increase with the amount of computer use.

The most common symptoms associated with Computer Vision Syndrome (CVS) are

- eyestrain
- headaches
- blurred vision
- dry eyes
- neck and shoulder pain

These symptoms may be caused by:

- poor lighting
- glare on the computer screen
- improper viewing distances
- poor seating posture
- uncorrected vision problems
- a combination of these factors

The extent to which individuals experience visual symptoms often depends on the level of their visual abilities and the amount of time spent looking at the computer screen. Uncorrected vision problems like farsightedness and astigmatism, inadequate eye focusing or eye coordination abilities, and aging changes of the eyes, such as presbyopia, can all contribute to the development of visual symptoms when using a computer.

Many of the visual symptoms experienced by computer users are only temporary and will decline after stopping computer work. However, some individuals may experience continued reduced visual abilities, such as blurred distance vision, even after stopping work at a computer. If nothing is done to address the cause of the problem, the symptoms will continue to recur and perhaps worsen with future computer use.

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Prevention or reduction of the vision problems associated with Computer Vision Syndrome involves taking steps to control lighting and glare on the computer screen, establishing proper working distances and posture for computer viewing, and assuring that even minor vision problems are properly corrected.

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## What causes Computer Vision Syndrome?

Viewing a computer screen often makes the eyes work harder. As a result, the unique characteristics and high visual demands of computer viewing make many individuals susceptible to the development of vision-related symptoms.

Uncorrected vision problems can increase the severity of Computer Vision Syndrome symptoms.

Viewing a computer screen is different than reading a printed page. Often the letters on the computer screen are not as precise or sharply defined, the level of contrast of the letters to the background is reduced, and the presence of glare and reflections on the screen may make viewing difficult.



Viewing distances and angles used for computer work are also often different from those commonly used for other reading or writing tasks. As a result, the eye focusing and eye movement requirements for computer viewing can place additional demands on the visual system.

In addition, the presence of even minor vision problems can often significantly affect comfort and performance at a computer. Uncorrected or under corrected vision problems can be major contributing factors to computer-related eyestrain.

Even people who have an eyeglass or contact lens prescription may find it's not suitable for the specific viewing distances of their computer screen. Some people tilt their heads at odd angles because their glasses aren't designed for looking at a computer. Or they bend toward the screen in order to see it clearly. Their postures can result in muscle spasms or pain in the neck, shoulder or back.

In most cases, symptoms of CVS occur because the visual demands of the task exceed the visual abilities of the individual to comfortably perform them. At greatest risk for developing CVS are those persons who spend two or more continuous hours at a computer every day.

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## How is Computer Vision Syndrome diagnosed?

Computer Vision Syndrome can be diagnosed through a comprehensive eye examination. Testing, with special emphasis on visual requirements at the computer working distance, may include:

- **Patient history** to determine any symptoms the patient is experiencing and the presence of any general health problems, medications taken, or environmental factors that may be contributing to

the symptoms related to computer use.

- **Visual acuity measurements** to assess the extent to which vision may be affected.
- A **refraction** to determine the appropriate lens power needed to compensate for any refractive errors (nearsightedness, farsightedness or astigmatism).
- **Testing how the eyes focus, move and work together.** In order to obtain a clear, single image of what is being viewed, the eyes must effectively change focus, move and work in unison. This testing will look for problems that keep your eyes from focusing effectively or make it difficult to use both eyes together.

This testing may be done without the use of eye drops to determine how the eyes respond under normal seeing conditions. In some cases, such as when some of the eyes' focusing power may be hidden, eye drops may be used. They temporarily keep the eyes from changing focus while testing is done.

Using the information obtained from these tests, along with results of other tests, your optometrist can determine if you have Computer Vision Syndrome and advise you on treatment options.

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## **How is Computer Vision Syndrome treated?**

Solutions to computer-related vision problems are varied. However, CVS can usually be alleviated by obtaining regular eye care and making changes in how you view the computer screen.

### **Eye Care**

In some cases, individuals who do not require the use of eyeglasses for other daily activities may benefit from glasses prescribed specifically for computer use. In addition, persons already wearing glasses may find their current prescription does not provide optimal vision for viewing a computer.

- Eyeglasses or contact lenses prescribed for general use may not be adequate for computer work. Lenses prescribed to meet the unique visual demands of computer viewing may be needed. Special lens designs, lens powers or lens tints or coatings may help to maximize visual abilities and comfort.
- Some computer users experience problems with eye focusing or eye coordination that can't be adequately corrected with eyeglasses or contact lenses. A program of vision therapy may be needed to treat these specific problems. Vision therapy, also called visual training, is a structured program of visual activities prescribed to improve visual abilities. It trains the eyes and brain to work together more effectively. These eye exercises help remediate deficiencies in eye movement, eye focusing and eye teaming and reinforce the eye-brain connection. Treatment may include office-based as well as home training procedures.

### **Viewing the Computer**

Proper body positioning for computer use.

Some important factors in preventing or reducing the symptoms of CVS have to do with the computer and how it is used. This includes lighting conditions, chair comfort, location of reference materials, position of the monitor, and the use of rest breaks.



- **Location of computer screen** - Most people find it more comfortable to view a computer when the eyes are looking downward. Optimally, the computer screen should be 15 to 20 degrees below eye level (about 4 or 5 inches) as measured from the center of the screen and 20 to 28 inches from the eyes.
- **Reference materials** - These materials should be located above the keyboard and below the monitor. If this is not possible, a document holder can be used beside the monitor. The goal is to position the documents so you do not need to move your head to look from the document to the screen.
- **Lighting** - Position the computer screen to avoid glare, particularly from overhead lighting or windows. Use blinds or drapes on windows and replace the light bulbs in desk lamps with bulbs of lower wattage.
- **Anti-glare screens** - If there is no way to minimize glare from light sources, consider using a screen glare filter. These filters decrease the amount of light reflected from the screen.
- **Seating position** - Chairs should be comfortably padded and conform to the body. Chair height should be adjusted so your feet rest flat on the floor. If your chair has arms, they should be adjusted to provide arm support while you are typing. Your wrists shouldn't rest on the keyboard when typing.
- **Rest breaks** - To prevent eyestrain, try to rest your eyes when using the computer for long periods. Rest your eyes for 15 minutes after two hours of continuous computer use. Also, for every 20 minutes of computer viewing, look into the distance for 20 seconds to allow your eyes a chance to refocus.
- **Blinking** - To minimize your chances of developing dry eye when using a computer, make an effort to blink frequently. Blinking keeps the front surface of your eye moist.

Regular eye examinations and proper viewing habits can help to prevent or reduce the development of the symptoms associated with Computer Vision Syndrome.

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## Computer Vision Syndrome Symptoms

Many of the symptoms of CVS (see Table 1) can be broadly classified as "asthenopia." Most of these symptoms are also associated with other forms of near work. Neck and/or backaches are listed as a symptom of CVS since the eyes lead the body. Computer workers will often assume awkward postures in order to position their eyes so that they can perform their work - resulting in these musculoskeletal symptoms. This can be the result of a poorly designed work station, assuming awkward postures due to using spectacles which are improperly designed for the task or due to making accommodations for a particular eye/vision disorder.

**Table 1:**  
**Computer Vision Syndrome (CVS) Symptoms**

Eyestrain (Non-Specific Ocular Discomfort)	Blurred Distant Vision
Fatigue	Dry or Irritated Eyes
Headache	Neck and/or Backaches
Blurred Near Vision	Diplopia (Double Vision)

In most cases of CVS, the clinician is able to establish a visual diagnosis for the symptoms being experienced (see Table 2). There are numerous accommodative disorders (e.g., decreased amplitude or infability of accommodation) and binocular vision dysfunctions (e.g., phoria, strabismus) that can clearly cause the symptoms. Uncorrected or improperly corrected presbyopia (improper add/or spectacle design) can also result in symptoms. Hyperopia can result in visual symptoms - especially in near workers. Uncorrected astigmatism can also cause symptoms because of the acuity demands of the task. In some cases myopia can cause a blurred view of the computer screen and/or awkward posture. There is also some evidence to indicate that near work causes the development of myopia in some individuals. A dry eye condition is one which can be exacerbated by computer work due to staring, elevated gaze angle, decreased blinking, and a low humidity environment.

Each of the CVS diagnoses presented in Table 2 can be treated - usually with a good prognosis for eliminating or reducing the presenting symptoms.

**Table 2:**  
**Computer Vision Syndrome (CVS) Visual Diagnoses**

Accommodative Disorders	Refractive Errors
Presbyopia	Hyperopia

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Binocular Vision Dysfunctions	Astigmatism
Dry Eyes	Myopia
CVS symptoms occur as a result of visual interaction with a task (the computer display) which stresses the visual system. The occurrence of symptoms depends upon the magnitude of any existing visual disorder as well as the demand level of the task. The task demand level can be dependent upon many variables. There are particular environmental factors associated with work at a computer which make it more visually demanding than other near point tasks. (See Table 3)	

**Table 3:**  
**Environmental Factors of Computer Workstations**

Contrast and resolution of the display	Room lighting
Viewing distances and angles	Sustained viewing
Adjustability of workstation	
Appropriate diagnosis and treatment of existing vision problems and control or elimination of environmental factors can effectively reduce the symptoms associated with computer vision syndrome.	

## Impact of Computer Use on Children's Vision

When first introduced, computers were almost exclusively used by adults. Today, children increasingly use these devices both for education and recreation. Millions of children use computers on a daily basis at school and at home.



Children can experience many of the same symptoms related to computer use as adults.

Children can experience many of the same symptoms related to computer use as adults. Extensive viewing of the computer screen can lead to eye discomfort, fatigue, blurred vision and headaches. However, some unique aspects of how children use computers may make them more susceptible than adults to the development of these problems.

The potential impact of computer use on children's vision involves the following factors:

**Children often have a limited degree of self-awareness.** Many children keep performing an enjoyable task with great concentration until near exhaustion (e.g., playing video games for hours with little, if any, breaks). Prolonged activity without a significant break can cause eye focusing (accommodative) problems and eye irritation.

Accommodative problems may occur as a result of the eyes' focusing system "locking in" to a particular target and viewing distance. In some cases, this may cause the eyes to be unable to smoothly and easily focus on a particular object, even long after the original work is completed.

**Children are very adaptable.** Although there are many positive aspects to their adaptability, children frequently ignore problems that would be addressed by adults. A child who is viewing a computer screen with a large amount of glare often will not think about changing the computer arrangement or the surroundings to achieve more comfortable viewing. This can result in excessive eye strain. Discomfort can also result from dryness due to infrequent blinking. Also, children often accept blurred vision caused by nearsightedness (myopia), farsightedness (hyperopia), or astigmatism because they think everyone sees the way they do. Uncorrected farsightedness can cause eye strain, even when clear vision can be maintained.



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